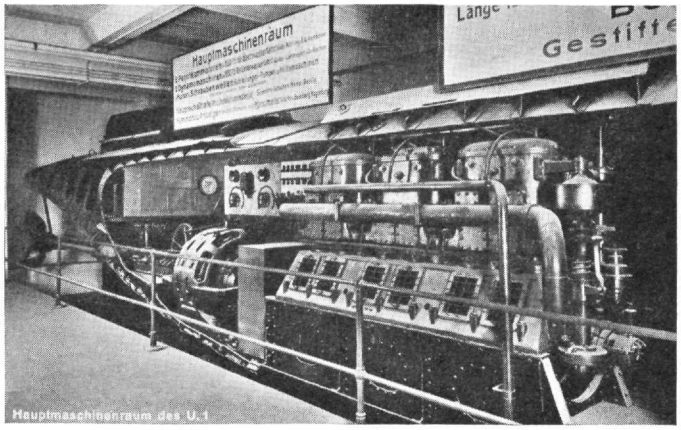


CUT SECTION OF GERMAN SUBMARINE

Something Different in Museums

By PAUL L. BRENNESHOLTZ, E.E. '32
In the School of Electrical Engineering, Cornell University

EDITOR'S NOTE—*This interesting article is reprinted by permission from the January, 1932, issue of the Sibley Journal of Engineering. Cuts courtesy of Sibley.*

THE Deutsches Museum in Munich, Germany, is a natural science and technical institution. It was founded by Doctor Oskar von Miller in 1903. People from all classes in Germany willingly gave money for its construction and equipment, business corporations helping as well as individuals.

The exhibits were first shown in a temporary building in 1906, but moved to the present location on May 7, 1925. This edifice was specifically designed by Gabriel von Seidl for the collections of the Deutsches Museum. It has nine miles of exhibits covering nine acres of floor space. The museum contains, among its larger setups, two planetariums, a full-sized windmill in working order for grinding grain, a five-story mine shaft borer, and an eleven-story pendulum. In a separate building is a library which is open to everyone and completely equipped to serve not only the noted scientist who may wish to study there but also the school lad who merely wants to look up a definition. There are also several lecture halls, the largest of which has a seating capacity of two thousand.

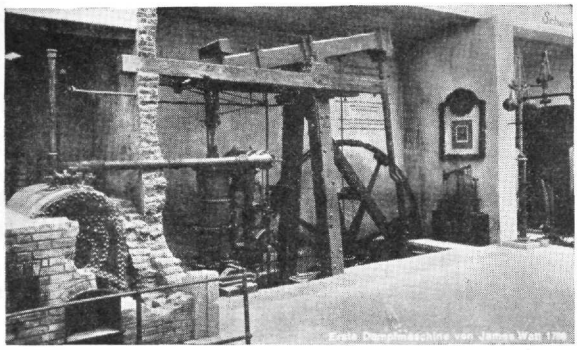
But surely it is not size or material things alone that can attract more than a million people to its portals yearly, especially when located in a city of only a half a million inhabitants. And so it might be well to state at this point just why a technical museum should rise to world renown from Bavaria's center of art.

The answer lies in the facilities for convincing oneself of how things work. You need not believe in signs; nothing need be left to your imagination; you may be from Missouri. If you do not believe that air has weight, merely press the button, hear the electrical air pump, see the balloon in the evacuated case fill, and watch carefully how that delicate scale slowly settles to one side. Or maybe you wonder how realistic the salt mine exhibit is. Just wet your finger, rub it first on the wall and then on your tongue—the good old pretzel flavor is right there. Perhaps you doubt that this black streak, six feet wide and fifty feet long, on the wall of the coal mine tunnel, is a vein of coal. Well, rub one finger on the grey rock and another on the coal vein and see if one doesn't come away black. Did you ever have a desire to see how a locomotive worked on the inside? There is one presented in section in the Deutsches Museum. First you turn the crank and then you can follow any valve, piston, or other moving part through its complete cycle of operations. Have you ever played with Roentgen rays? Step into the dark booth, press the button, and see yourself on the prepared glass screen. Do you know why we pick up the North Star for finding direction and trust it so well? Merely request the planetarium attendant, either in German or English, and he will rotate the stars in the heavens so fast for you that your eye cannot help but find the center of rotation and then see which star it is which apparently never moves. Of course you have seen rock drillers, and heard their deafening sound. But here you can work one, feel its vibration, hear it up close, wield it whether two feet long or thirty. And so on, perform your own experiments and satisfy yourself.

The next question is how much of his museum is in working order? That is a simple problem for there are seven sections and one is closed for repairs each day in the week. Thus in any two consecutive twenty-four hour periods, one can see all the exhibits and every setup will work.

Now for a stroll through this labyrinth of science. The first topic will be transportation, by land, sea, and air.

In the first land-transportation exhibit, the development of means for facilitating walking are shown. First, there is a life-size man on snowshoes, then stilts, roller skates, and skis. Not much new here, but next comes the original bicycle, a laufräder. It means, literally, run-



JAMES WATT'S FIRST STEAM ENGINE—1776

ning wheel. Perhaps this is not so familiar to most of us. There are two wheels the same size, frame, and handlebars, but no pedals, chain, or brake. You just sit on it and run along the ground. Of course the laufräder rolls right along between each step so you really make progress. Yet here is the original bicycle with two equally large wheels followed by that later style, with pedals and a huge front wheel. Finally, we return to modern times with the chain and sprocket replacing that large front wheel, and both wheels are the same size again.

In the automobile line there are two particularly notable machines. The Daimler auto, now a car of our Lincoln class, was built in 1885. It is a four-wheel, two-seater, fair-weather vehicle with more than half of the motor on the floor in front of the back seat. It is not a wreck at the present time but in rather good condition throughout. Then there is the first Benz auto of 1886. This is a three-wheel, one-seat automobile, and has all the machinery in the rear. In fact there is only a simple guiding wheel and its steering gear in front of the machine.

A very interesting wagon on exhibition is that formerly belonging to King Ludwig II of Bavaria. It is a golden coach elaborate beyond description. The spokes and rims are intricate carvings. A face is sculptured on each hub and set on a background consisting of a many-pointed, finely chiseled star. The doors are a maze of fancy leaf scrolls, and in the middle of each is a lovely painting. In front a beautiful maiden blows a trumpet to lead the way. On her back is a huge curled-up leaf which forms a foot-rest for the driver. Up on top is another maiden holding high a crown. How typical of European art, how different from America!

Next we see an old horse-drawn train. The vehicle is not set there all by itself but is placed on tracks mounted on the old-fashioned roadbed upon which the horse had to run in those times. Furthermore, the horse which draws this train is itself life-size with all the necessary trapping. How much easier to visualize the actual conditions existing in those days when you are able to stand there and see this train whizzing along from Linz to Budweis way back in 1828. Next is a glass case where we follow the development of locomotives down to the present day by means of quite complete little models. This last is not an uncommon museum display, but as soon as we step out into the yard there is immediately something different. A set of tracks has been laid. There are semaphores, plenty of different branch tracks with various switching devices, and two typical railroad stations with electrical control equipment and telegraph apparatus—all for the public to monkey with and give it satisfaction.

Now we enter the one large room containing flight exhibits. Hanging from the ceiling are two grotesque old airplanes with wings and tail shaped just like mammoth birds in flight. There is an up-to-date plane, too. But airplanes are not all. A box kite designed to carry human beings is shown next to a pair of so-called human wings with a life-size passenger in them. It doesn't look as if he flew very far in that contraption. Models of all the world's lighter-than-air craft are lined up around the balcony and their comparative size can be seen at a glance. The R-100, Shenandoah, Los Angeles, and Graf Zeppelin are all there, and no doubt a model of the Akron has the place of honor by now, new as it is. To conclude this more or less confusing ensemble are modern airport and airdrome designs in picture and model. A large pair of bird's wings are set up in a case so that you can work them by machinery and see by indicators in what direction the air is sent.

Finally we come to water transportation. First, we see a South Sea Islander in the act of paddling his hand-hewn, outrigger canoe. Rather than set him before a South Sea Island painting, they have completed this picture with genuine vegetation, dried out of course, but

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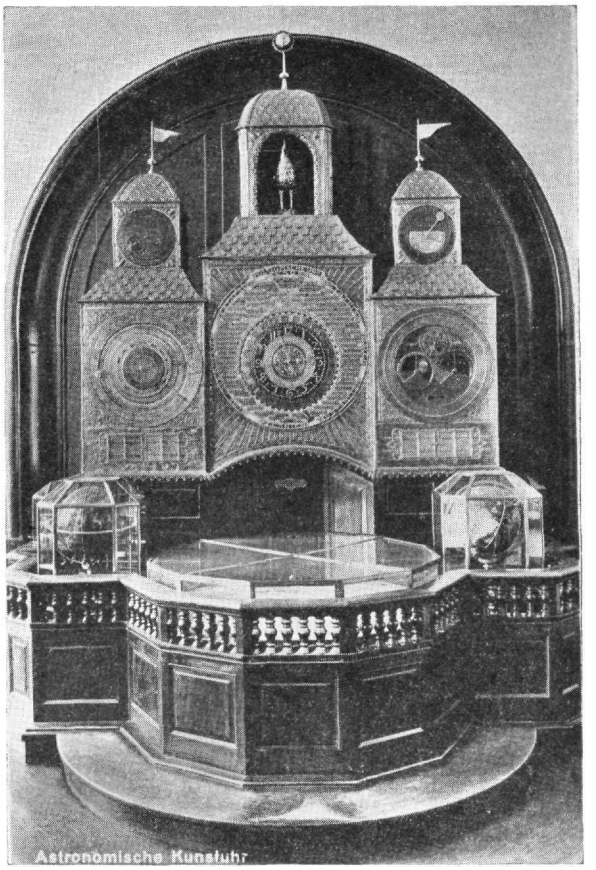

THE MUSEUM'S ASTRONOMICAL CLOCK

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three dimensional and no fakes just as far as it was possible to present the scene. Passing by the development of the sailboat which, though very good, is presented in the popular way, we come to the submarine. Believe it or not, the German submarine U-1 has been cut in two, and one-half, complete along its entire seventy-five or more feet, has been placed in this museum. There is the engine room, sleeping quarters, observation room with periscope going through the top, and a narrow alley from end to end. The tips are seen to be made up of two shells. The inner one is thicker and between the shells loose blocks of cork have been placed for cushion effect in case the submarine ran into something. Pretty handy way of inspecting a stuffy, narrow submarine, don't you think?

After this we come to a 50 by 3 by 3 foot glass encased canal. A little boat on the water is also glass enclosed. There are guiding wires on either side of the canal and a spring stop at either end. The visitor may wind up the craft, set it in the water and then walk along slowly beside it seeing just how the motor turns over, the wheels rotate, and spin the propeller as the boat ploughs down its channel.

Turning aside from the above demonstration, we have before us in one glance a fine comparison of the development of speed in ocean crossings. At the top is a tiny outline of the old sailer "Deutschland," moving as on an endless chain from left to right at a rate proportional to the thirty days required to cross the Atlantic in 1847. Right below it and going twice as fast, is the first steamship, taking fifteen days to cross in 1857, and so they go down through "Schnelldampschiff," meaning, literally, fast steamship, the "Bremen," "Graf Zeppelin," and Lindbergh's plane, the latter making it in one and one-half days. Obviously Lindbergh's plane is making circles around the sailer "Deutschland" but other points besides speed are also strikingly represented. In the first place these speeds were all records in their day, and four of the six go to Germany. Lastly, the records by the "Bremen," 4½ days, "Graf Zeppelin," 2½ days, and Lindbergh in 1½ days, were all made in 1929.

And then a real ocean vessel. Yes sir, the real thing. Just walk right out on deck, folks, and we'll start our inspection trip. Why, the floor slopes; it does that on board ship too. See, here are your familiar wide, tarred seams in the floor boards, the ceiling is low, genuine steel construction is overhead, a railing runs along the inner walls, and the storm windows are up on the sea side. Next we step into the dining room. It is full size and complete, even to the port-hole windows. As we walk along the corridors we must step up over the water seals between the different sections. On our left and right are to be seen sections of steerage and first-class respectively. The radio room is there, and then the bridge. Here we have a complete set of control elements. The harbor view out of the window is so clear that, together with the reality of this entire museum, one has to look twice to convince oneself that it is only a painted scene this time. After that we go downstairs and the twenty-foot high, oil-burning boilers meet our gaze. Back to the real thing again, but that isn't all. The floor is made of that familiar engine-room sheet steel, loosely bolted at the corners and rattling at every step. Even the walls are steel, and furthermore they form the ship's hull, coming closer together at the bottom with the ribs sticking out. In fact it brings back remembrances of that voyage over, so vividly that one feels that rolling motion again.

Completing the subject are suggested modern harbor plans. Cross sections of many of our largest ships are

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shown with the scale small enough to give room details easily identified from the ship you came over on. A couple of real buoys may surprise you by their enormous size. Or maybe you have never inspected a lighthouse beacon up close. Finally, step out into the yard and see how many feet a propeller towers over your head, but it's just from a small ocean-going vessel after all.

Thus endeth our jaunt through approximately one-third of one of this museum's seven sections, with much more of interest to come in the following parts.